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ABSTRACT

Space Shuttle Glider is a scale model of the U.S. Space Shuttle orbiter. The airplane-like orbiter usually remains in Earth orbit for up to two weeks at a time. It normally carries a six- to seven-person crew which includes the mission commander, pilot, and several mission and/or payload specialists who have specialized training associated with the payloads and experiments being flown on that mission. This brief provides a hands-on activity for building a model of the Space Shuttle. (ASK)

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National Aeronautics and Space Administration

Educational Product	
Educators & Students	Grades 5-12

EB-2000-08-130-HQ

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Educational Brief

Space Shuttle Glider

Your Space Shuttle Glider is a scale model of the U.S. Space Shuttle orbiter. The airplane-like orbiter usually remains in Earth orbit for up to two weeks at a time. It normally carries a six- to seven-person crew, which includes the mission commander, pilot, and several mission and/or payload specialists who have specialized training associated with the payloads and experiments being flown on that mission.

The Space Shuttle system can perform many types of missions. Some missions may involve deployment, servicing, or retrieval of payloads such as communication satellites or orbiting observatories. Other missions may carry the pressurized spacelab module and scientific instruments capable of making astronomical observations or studying Earth's changing environment. The Space Shuttle also transports International Space Station components for assembly on orbit. At the end of a Shuttle mission, the orbiter is piloted back to Earth and lands on an airstrip like an airplane. It is then refurbished so that it can fly another mission.

The orbiter and its engines are just part of the Space Shuttle system. The other parts (not modeled here) are the solid rocket boosters (SRBs) used for launch and the external tank that contains approximately two million items liquid propellant for the three main Shuttle engines. Almost all of the parts are reusable with the exception of the external tank that is jettisoned just before the Shuttle achieves Earth orbit. The ability to reuse equipment substantially decreases the cost of space operations. During our Earthbound years we relied on vehicles such as trucks, trains, boats, and airplanes to provide for all of our transportation needs. Now that we have expanded our destinations to include Earth orbit, we can add the Space Shuttle to that list.
For more information: http://spaceflight.nasa.gov

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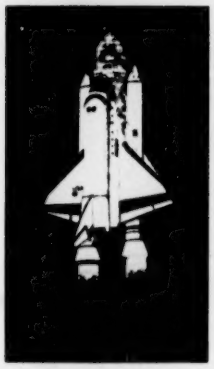
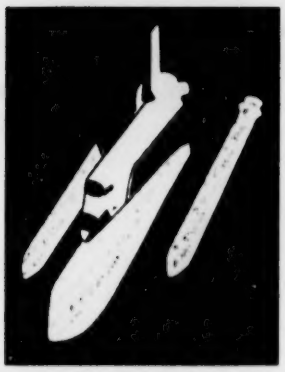
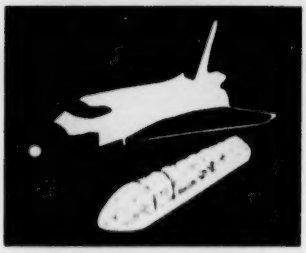


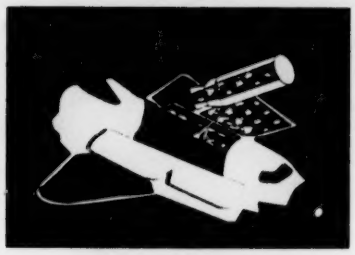
LAUNCH



BOOSTER SEPARATION



EXTERNAL TANK SEPARATION AND ORBIT INSERTION



ON-ORBIT OPERATIONS

RE-ENTRY

Space Shuttle Glider Assembly Instructions

AIRSTRIP LANDING

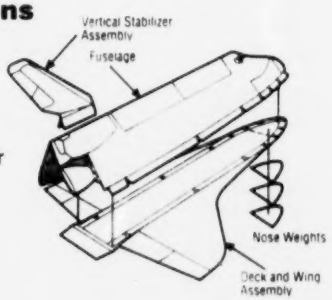
Assembly Instructions

Read carefully before assembly.

1. Cut out all parts using scissors.
2. Cut out V-shaped notches on Fuselage to create tabs along outside edge. Fold tabs out.
3. Glue or tape three Nose Weights to underside of glider nose. Use the fourth weight provided if needed for extra trim after assembly.
4. Fold Fuselage along middle line.
5. Starting at the nose, glue or tape fuselage to Deck and Wing Assembly. Match tabs on Fuselage exactly to those two halves together using tabs provided.
6. To close the nose, glue or tape the two halves together using tabs provided.
7. Fold Vertical Stabilizer Assembly. Fold out tabs A and B. Except for tabs A and B, glue or tape Vertical Stabilizer Assembly to make one solid piece.
8. Attach Vertical Stabilizer to Fuselage, matching tab A with point A and tab B with point B.

Preflight Instructions

For the best results, launch your glider with a gentle level toss. Bend the Body Flap for slightly greater lift.



Space Shuttle Glider Challenges

Challenge #1—Determine the scale of the glider

Needed: Space Shuttle Glider, metric ruler, and calculator
What To Do: Measure the length of your glider in centimeters. Divide your answer into the length of the real Space Shuttle orbiter to determine your glider's scale.
Space Shuttle orbiter length: 3,724 centimeters.

Challenge #2—Glide ratio

Needed: Space Shuttle Glider and tape measure
What To Do: Gently launch the Space Shuttle Glider horizontally from a measured height above the floor. Measure how far across the floor the orbiter traveled from the launching point. Determine the glide ratio by dividing how far it traveled by the distance it dropped to the floor. Research the glide ratios of other aircraft such as commercial jets, small private planes, and sail planes.

Challenge #3—Fishing Line Guidance System

Needed: Space Shuttle Glider, paper clips, nylon fishing line, cellophane tape, and book
What To Do: Spread open two paper clips so that they become "S" hooks. Straighten out the lower end of the S for each hook and attach these straightened ends to the back of the glider with tape. One clip should be in the nose and the other in the tail. Tie one end of the fishing line around the book and set the book on the floor. Stand several meters from the book and hold the other end of the fishing line about one meter above the floor. Hook the glider onto the fishing line and let it go. Try to get the glider to land on the floor without running into the book.

Assembly Instructions (Read carefully before assembly.)

1. Cut out all parts using scissors.
2. Cut out V-shaped notches on Fuselage to create tabs along outside edge. Fold tabs out.
3. Glue or tape three Nose Weights to underside of glider nose. Use the fourth weight provided if needed for extra trim after assembly.
4. Fold Fuselage along middle line.
5. Starting at the nose, glue or tape fuselage to Deck and Wing Assembly. Match tabs on Fuselage exactly to those two halves together using tabs provided.
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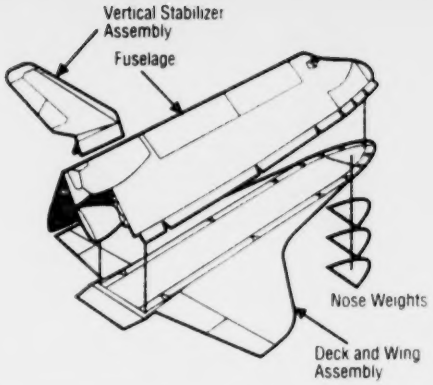
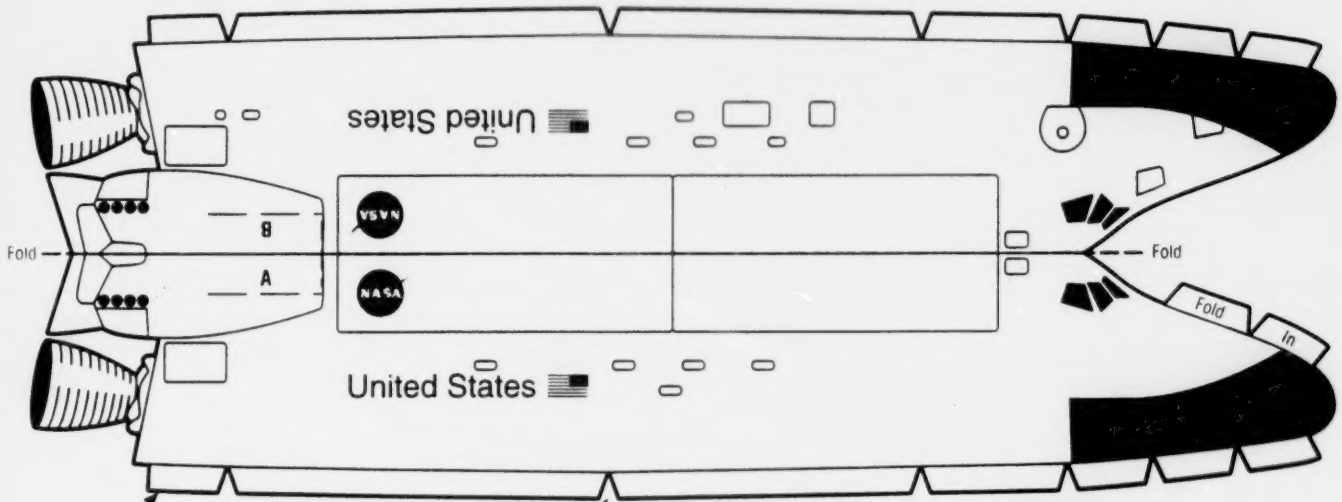


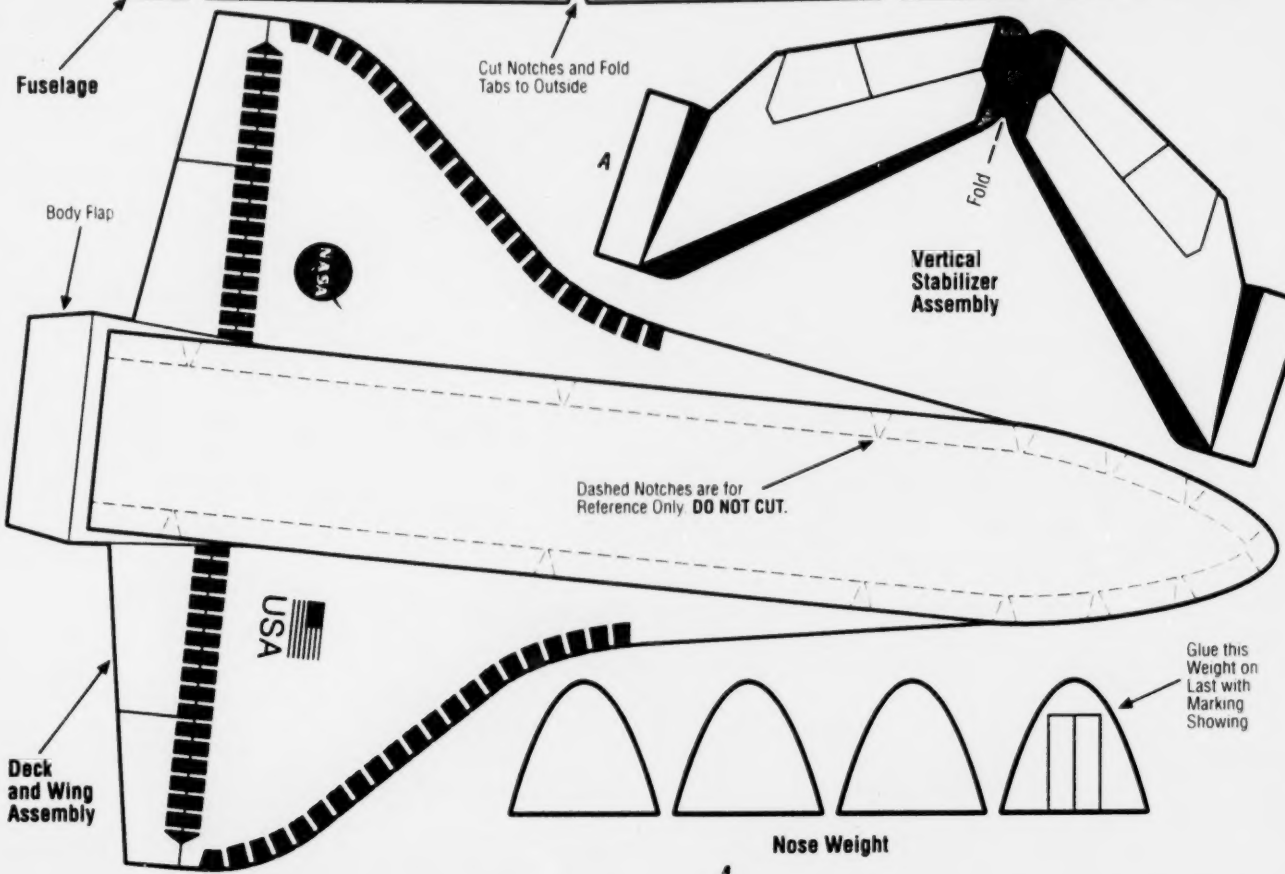


Fuselage

Cut Notches and Fold Tabs to Outside

Vertical Stabilizer Assembly

Body Flap



Deck and Wing Assembly

Nose Weight

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